Kolloquium

Theoretische Physik

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Coupling to flexural phonons in graphene with broken mirror reflection symmetry

In graphene, the intrinsic electron-phonon coupling to the low-energy out-of-plane flexural phonons is quadratic in the phonon deflection of the graphene sheet due to the mirror reflection symmetry in the plane (z -> -z). However, in experimental situations where graphene is positioned in an electric gate field or supported by a substrate, the mirror reflection symmetry is often broken and a linear electron-phonon coupling to the highly excited flexural modes arises. In this talk, I will discuss the different mechanisms which can break the mirror reflection symmetry and present simple model as well as atomistic calculations of the resulting electron-phonon interaction. Finally, I will discuss the impact on 1) the low-field conductivity in graphene, and 2) the electron-limited Q-factor in graphene-based nanomechanical resonators.